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ABSTRACT

This paper is a case study of Longfellow Elementary, a K-8 school in San Diego (California) that is using the concepts of information architecture to develop its Web site. The site is intended to be a virtual meeting place for all of the school's constituents: parents, teachers, students, and the community at large. The site is a dynamic, ongoing endeavor, and site developers will continue to use processes of information architecture to guide its growth. The paper presents the school's Web site, the theoretical background on information architecture, a user-centered model for development, and recommendations for other schools pursuing similar projects. Contains 10 references. (Author/MES)

Designing a School's Web Site Using Information Architecture

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Abstract: This paper is a case study of a K-8 school in San Diego, California, USA, that is using the concepts of information architecture to develop its Web site. The site is intended to be a virtual meeting place for all of the school's constituents: parents, teachers, students, and the community at large. The site is a dynamic, ongoing endeavor, and site developers will continue to use processes of information architecture to guide its growth. The paper presents the school's Web site, the theoretical background on information architecture, and recommendations for other schools pursuing similar projects.

Introduction

It is often stated that we live in an "information society." Increasingly advanced communication technologies, including the Internet and digital telecommunication technologies, allow us to communicate across the globe at faster and faster rates. Wurman (1998) describes the situation as a "tsunami . . . a tidal wave of unrelated, growing data" that requires organization if it is to make any sense (Wurman, 1998, p. 15). Clearly, educational institutions are not shielded from this "tidal wave" of information. The Internet has pervaded most levels of society, and we hear increasing calls from politicians and educators to provide teachers and students the opportunity to use the Internet for instruction and learning.

As we have become submerged in this ocean of information, the discipline of information architecture has evolved to meet the challenge of organizing and using information to provide meaningful communication. Information architecture is a structured process of presenting data to meet the informational and management requirements of an organization or group of people, and its focus is always user-centered. This paper presents a case study of the applications of information architecture to the design and development of a K-8 school Web site.

The Longfellow Web Site

Longfellow Elementary (located in San Diego, California, USA) is a Spanish Immersion Magnet School with grades K-8. The program was started in 1977 and serves about 500 children from all over San Diego. Students become fully bilingual in Spanish and English by the time they leave the program. Teachers and administrators at Longfellow perceived a need to improve communication between parents, teachers, and the community at large. This need gave rise to the idea of using a web page as a tool for communication and to have a virtual representation of the school community. The primary goal of this ongoing project is to encourage the entire school community to participate in the information exchange provided by the school's Web site. The Web site is a virtual meeting place where all members of the community can share important information and have dynamic and useful interactions. The school community is separated into three groups: parents, teachers, and students. Each group has the opportunity to best use the virtual space on the Web site to meet its unique needs.

Traditionally, school Web sites are used to provide basic information about the school and do not go beyond a superficial "show and tell" of schedules and activities. The project at Longfellow has broken away from

this model by using principles of information architecture to structure the site to meet the needs of a diverse community and to develop new uses of Web technology.

Information Architecture and Web Page Design

Theoretical Background

The field of information architecture embraces such diverse disciplines as business administration, computer science, cognitive psychology, graphic and typographic design, and technical communication. A user-centered approach to design is informed by principles of information theory and communication theory, information design theory, the findings of cognitive psychologists on perception and learning, hypertext theory, and sociocultural learning theory. Some of these theoretical considerations are briefly discussed below.

Information design theory draws on information and communication theory to suggest that designers structure information in ways that minimize "noise" and facilitate the transfer of meaning. Many factors, including personal characteristics, past experiences, and present feelings, can affect individual interpretation of sensory information (Stern & Robinson, 1994).

Vygotsky's (1978) sociocultural learning theory suggests that learning takes place as learners interact with more advanced peers and adults. The Vygotskian model of instruction is highly democratic rather than authoritarian. The teacher is a co-participant in the student's construction of knowledge (Stremmel & Fu, 1993). Effective instruction requires intersubjectivity, or the creation of shared meaning through collaboration (Stremmel & Fu, 1993; Wertsch & Sohmer, 1995). Teacher and student share power and authority in the classroom (Driscoll, 1994). The distribution of responsibility for both learning and instruction among students as well as teachers is a hallmark of the Vygotskian model.

Hypertext can provide instructors with a powerful tool for allowing learners to visually map their own representations of knowledge. Collaboratively-developed hypertext documents can also serve as sociocultural learning tools, providing learners the opportunity to "interact" with peers and expert users, even those who are geographically removed from the learner (Victor, 1999a).

A User-Centered Model for Development

The literature on information architecture suggests that Web site creation requires a systematic process of audience and content analysis; creation of detailed site diagrams and documentation; and production and implementation (Rosenfeld & Morville, 1998). Development of user-centered Web sites may be guided by a four phase model: Design, Develop, Deploy, Document (Victor, 1999a). This is a cyclical, iterative process, as illustrated in the following diagram:

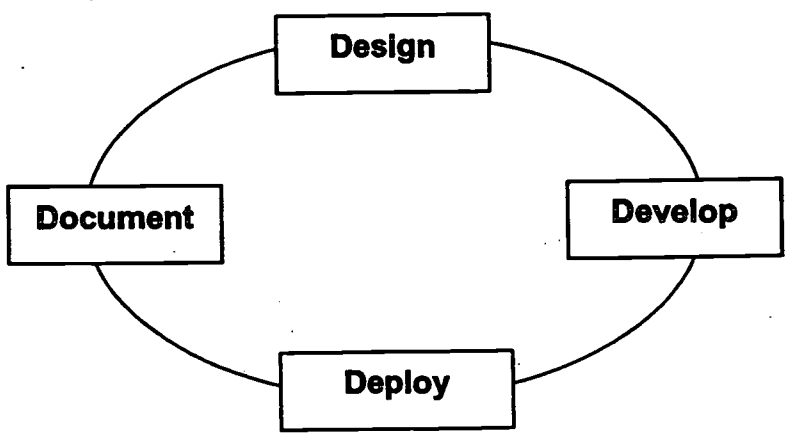

Figure 1: A user-centered model of Web site development.

In the **Design** phase, the designer performs needs analysis, audience analysis, and task analysis. The activities associated with this phase are identical to those found in traditional models of instructional design. In

collaboration with the intended audience or the client, the designer develops initial prototypes and blueprints. After client approval, the project moves to the **Develop** phase, in which the development team builds the product according to the specifications developed during design. In this phase, the designer works with graphic artists and technical experts to build the site. As the product is developed, the design/development team meets with the client for discussion and negotiation of modifications, if needed. Upon client approval of the final product, it is moved to the **Deploy** phase. In this phase, the Web site is installed and made available to the target audience. In the **Document** phase, the design/development team assembles project documents and blueprints and presents them to the client to guide future product revisions. This documentation feeds into future Design phases, and the cycle continues.

Design and Development of Longfellow School's Web Site

As stated above, the Longfellow School community include parents, teachers, and students, and the Web site provides for the needs of each group. There are sections dedicated for the use of each group of the school community. In keeping with the user-centered focus of information architecture, the Web developers at the school chose to adopt a child-centered process from the start. Children were allowed to vote on different aspects of the web page since the children's education is the primary reason for the existence of the web page. A child-centered approach also helped the Technology Committee to decide on what information to allow in the School's web page. Even the information placed on the web page by adults is made to help the education of the children. The teacher and parent sections are left to the discretion of adults, and the student sections are created with adult supervision.

Another important contribution of the Longfellow Web site is that the students are able to publish their work on the Internet. Proponents of constructivism suggest that learners construct their own knowledge in ways that are personally meaningful and so should be allowed to engage in activities that aid them in their own construction of knowledge. Knowledge is constructed as users assimilate multiple perspectives on a topic (Nelson & Orey, 1991). Schools can use the principles of user-centered information design to allow students to create Web-based resources that foster their own construction of meaning (Victor, 1999b). At Longfellow, students learn to be participants in the "information superhighway" through a constructivist approach from very early in their lives at the school. The experience of publishing their own work helps them become more critical consumers of information as they learn to evaluate other information they see on the Internet (just as playing an instrument helps with music appreciation).

Further assistance has been provided by SciberNet, Inc., a software development company that has helped with hosting the site and with training staff and students in creating Web pages. They also provide guidance with technical questions. Each summer, SciberNet has trained approximately 20 students from grades 3-7 to create web pages in two sessions. Several teachers also participated in these training sessions.

Through a grant received from the State of California, all staff at Longfellow were given monthly inservice training in technology for two years, including training in Web page development. After analyzing surveys of staff computer proficiency, it was determined that the school's level of computer knowledge had gone

Contributions of Information Architecture

The first attempts at creating a web page at Longfellow proved to be exciting, but as more information was added to the side the need for change became evident. The site became increasingly complicated, and the user could get lost trying to navigate through it. It was clear that a complete remodeling of the web site was required. Application of principles of information architecture allowed for the newer version of the web page be friendly and useful to the user.

Distinct categories on the opening page help users determine what information they can access on the site. In addition, the depth (number of links) to get to the desired information was placed to a minimum (2-4 jumps at the most). This eliminates the confusion of scattered information and assists the user in finding required information rapidly. A clearly-defined labeling system is an essential element of a usable Web site (Rosenfeld & Morville, 1998). Longfellow has adopted a color-coded labeling system to it easy for users, especially children, to access desired sections of the site.

Organizing information using information architecture has made it easy to assign Web development responsibilities to specific individuals or groups, simplifying site maintenance. This has created a more cohesive organization system since members of the community are able to learn about and from each other. The Longfellow site contains links to relevant educational resources outside the site, removing the need to surf the Internet looking for information. This capability helps users invest their time more wisely and enhances the educational program of the school.

Description of the Site

The site's opening page introduces the school and provides links to each community group's section, as shown in Figure 2.

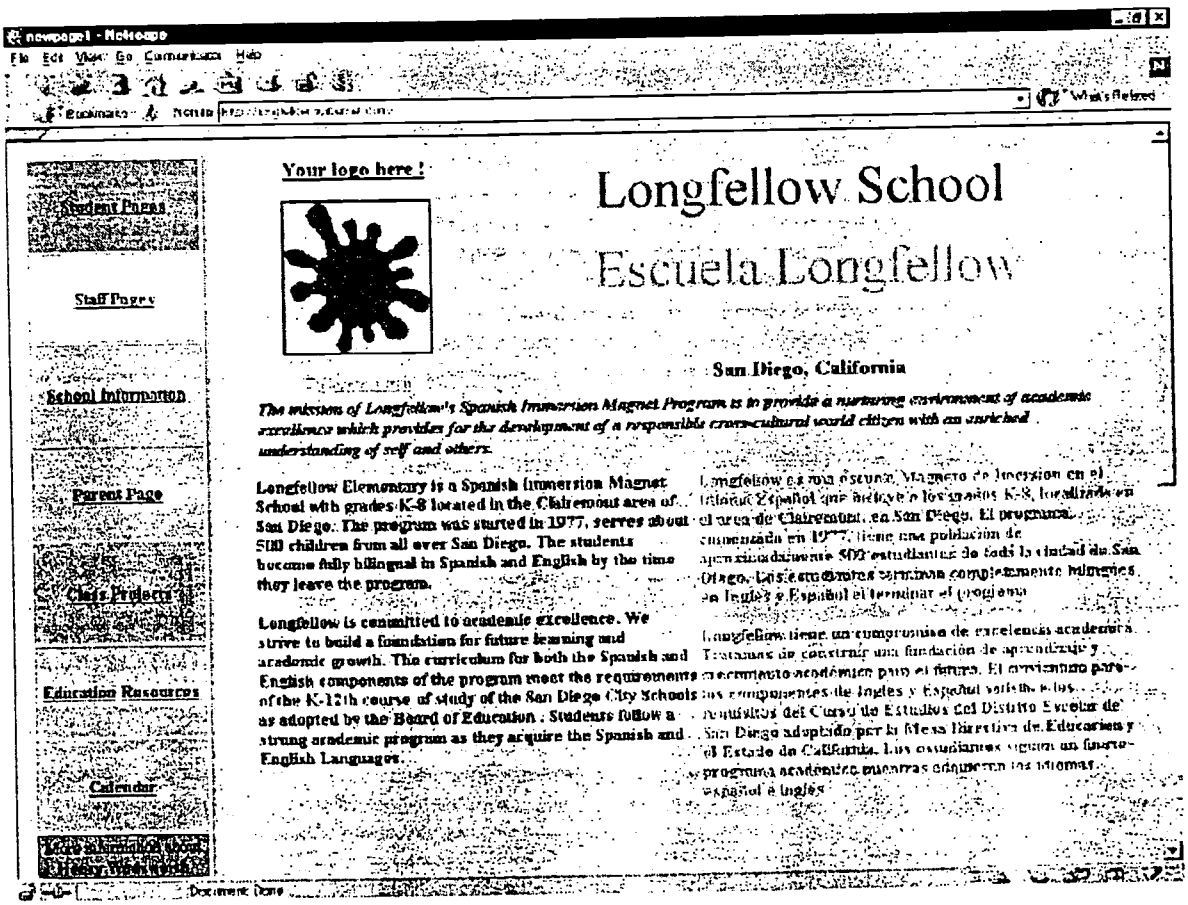

Figure 2: Longfellow School Web site (http://longfellow.scibernet.com/).

On the left column, the student pages are placed at the top to emphasize the importance of a student-centered approach. Students use this section for publication of their work.

Beneath the Student Pages link is the link to Staff Pages, where teachers give important information about the educational programs available at the school. Information such as daily schedules, class rules, book report forms, and other handouts are available for parents and students 24 hours a day.

The Parent Page section gives information on PTA (Parent Teacher Association) meetings, parental involvement activities such as beautification projects, fundraisers, and a yearly schedule of events.

The School Information section explains in greater detail the specialized language program at Longfellow. Furthermore, the Education Resources page provides links to the Internet that are relevant to the education of

Discussion and Recommendations

The design and development of the Web site at Longfellow School has been a valuable learning process for the Longfellow community. We hope that other schools can learn from the experience of Longfellow. The following recommendations have emerged from the process of developing a Web site for the Longfellow community.

- A major area of concern is that while a large number of people are included in the project, and most do not have a good idea of how to create a Web site. Training in site design is essential; ideally, all members of the community (teachers, students, and parents) should have some training. It is also important that participants work toward developing consensus on site contents.

- Initially, the information placed on the web page needs to be important and of great value to the school community. It should also be information that does not change frequently (for example, book report forms or Frequently Asked Questions) since it is difficult to make rapid changes to the site.

- Having an organization such as Scibernet, or a Technology Resource Teacher from the district, to deal with the mundane job of maintaining the server, allows beginning Web developers to focus more on the creative aspects than on technical issues.

- As the use of the site increases, it is likely that the institution will need to purchase its own server. Begin with small steps, and place the most important information on the server first.

- Maintain a focus on keeping the site simple because teachers and administrators are often required to perform other school district priorities.

- Remain flexible and open to new ideas so that diverse groups in the community can make their voices heard.

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